ONTARIO MINISTRY OF ENVIRONMENT
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OPERATING SUMMARY

BURLINGTON-ELIZABETH GDNS.

1972

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Burlington ~ Elizabeth Gardens
: water pollution control plant.
81582

Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

DS Caverly
D.S. Caverly,
Assistant Deputy Minister.

D McTavish
D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

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ASSISTANT DIRECTOR
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REGIONAL SUPERVISOR
P.J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West
Toronto 195

BURLINGTON-ELIZABETH GARDENS
WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF BURLINGTON

by the

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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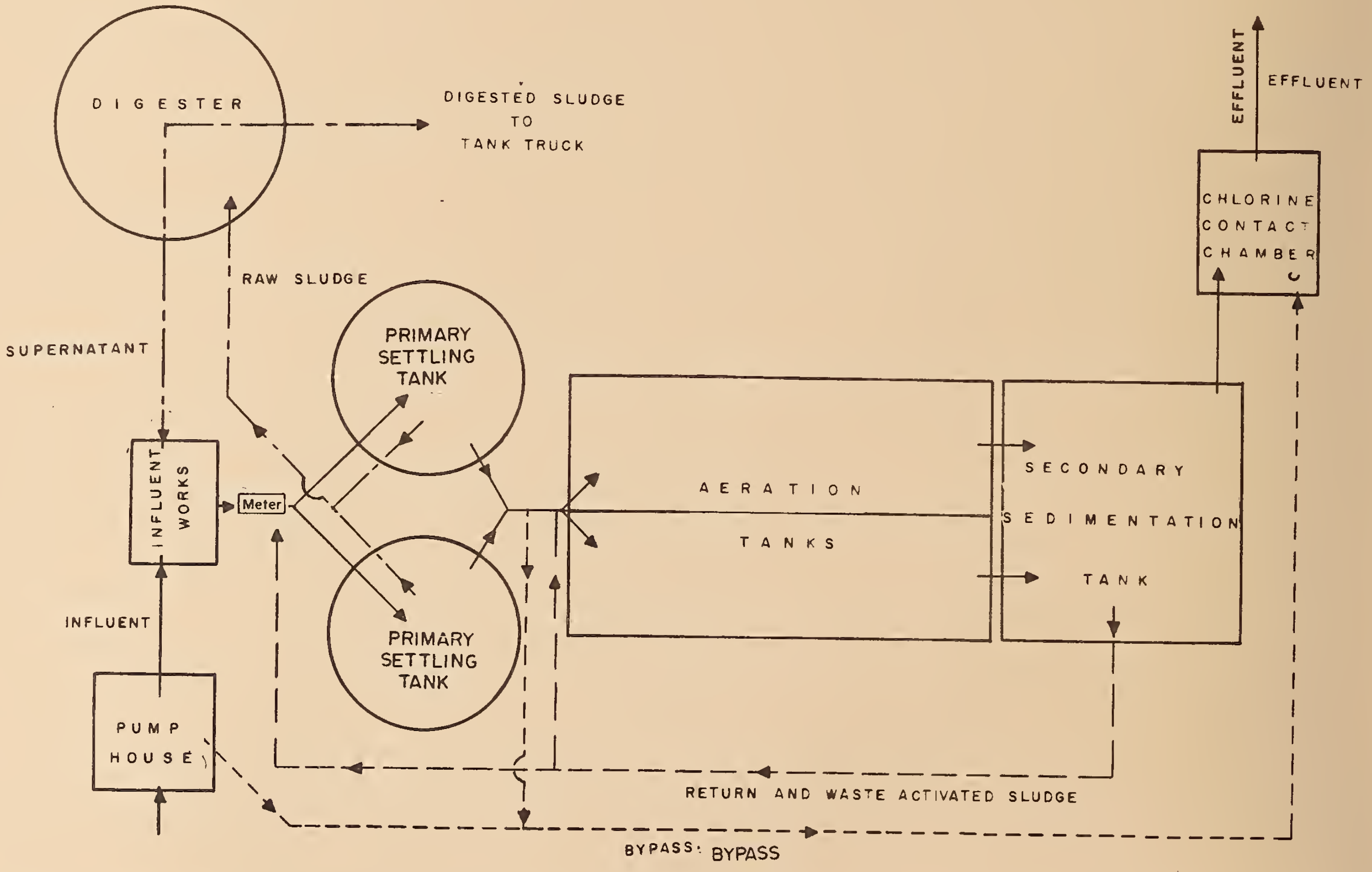
BURLINGTON ELIZABETH GARDENS
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0028-58
TREATMENT	Activated Sludge
DESIGN FLOW	0.750 mgd
DESIGN POPULATION	7,500
BOD - Raw Sewage	253 mg/l
- Removal	90-95%
SS - Raw Sewage	280 mg/l
- Removal	95%

LIFE STATION

Pumps (@ 35' tdh)

One Fairbanks-Morse	600 gpm (electric)
One Smart-Turner	250 gpm (electric)
One Smart-Turner	125 gpm (electric)
One Smart-Turner	300 gpm (gas)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: Model B (18")

Grit Removal

Type: Air degritter (with 4 Colaflex diffusers)
Size: 14' x 8' x 7' (avg depth)
Retention: 10 min

Primary Sedimentation

Type: Dorr
Size: Two 22' dia x 9' swd (6250 gal)
Retention: 2 hours
Loading: Surface, 980 gal/ft^2/day
Weir, 5,430 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Single-pass
Size: Two 98' x 19½' x 12'
(44,000 cu ft or 274,000 gal)
Retention: 8.8 hours

Air Supply

Two Hoffman Cyclo Blowers
Size: 750 cfm each

Diffusers

60 Colaflex diffusers per tank

Secondary Sedimentation

Type: Dorr
Size: Two 40' x 40' x 10' swd (8,600 gal)
Retention: 2.75 hours
Loading: Surface, 470 gal/ft^2/day
Weir, 4,690 gal/ft/day

CHLORINATION

W & T 200 lb/day

Chlorine Contact Chamber

Retention: 10 min

OUTFALL

- to Lake Ontario

SLUDGE HANDLING

Digestion System

Type: Single-stage with one Dorr-Oliver draft tube mixer
Size: One 45' dia x 20' swd ([illegible],600 cu ft or 196,000 gal)
Loading: 1.6 lb/ft^3/mo

'72 Review

GENERAL

The Burlington Elizabeth Gardens project consists of an 0.75 mgd secondary water pollution control plant utilizing the conventional form of the activated sludge treatment process. The plant is located in a residential area near Lakeshore Road.

Plant effluent is discharged to Lake Ontario. Sludge is digested anaerobically and removed by tank truck for land disposal.

This plant is one of the three Ministry of the Environment operated treatment facilities in the Town of Burlington. Municipal forces operate the sewage collection system, including 15 pumping stations, three of which are Ministry financed. The cost of operating the collection system and pumping stations is not reflected in the costs shown in the body of this report.

EXPENDITURES

The 1972 operating costs totaled $26, 545.50, down from $29, 898.26 in the previous year. The change was due primarily to changing the portion of the total Burlington projects salary cost allocated to the project from 20 to 15 percent. The unit cost of operation was $69 per million gallons treated as compared to $74 in 1971.

PLANT FLOWS AND CHLORINATION

The total plant flow in 1972 was 286.3 million gallons, relatively unchanged from the previous year. The plant continued to operate at approximately 140 percent of its hydraulic design capacity.

Chlorination of the plant effluent was practised during the period May 15 to October 15. An average chlorine dosage of 3.3 mg/l was required to maintain a 15 minute chlorine residual of 0.5 mg/l in the treated effluent.

PLANT EFFICIENCY

The average raw sewage strength was 111 mg/l BOD and 186 mg/l suspended solids as compared to 131 mg/l BOD and 161 mg/l suspended solids during the previous year. The total organic loading was relatively unchanged from 1971. Plant effluent averaged 18 mg/l BOD and 17 mg/l suspended solids, both of lower quality than the Ministry objectives of 15 mg/l in each case.

Phosphorus concentrations in the raw sewage averaged 8.7 mg/l during 1972 as compared to 10.2 mg/l during the previous year. Phosphorus concentrations in the plant effluent averaged 5.1 mg/l in 1972 as compared to 4.3 mg/l during 1971.

SLUDGE DIGESTION AND DISPOSAL

During 1972 a total of 685,000 gallons of raw sludge was pumped to the digester, slightly higher than in 1972. A total of 3,442 cubic yards of sludge was trucked from the plant for land disposal during the year.

CONCLUSIONS

The completion of modifications to pumping station No. 6 to increase its capacity and to direct flows from the Elizabeth Gardens plant to the Skyway plant reduced flows to the design level during part of the year. However, the flows for December, which was unusually wet, averaged almost 200 percent of design.

PROJECT COSTS

NET CAPITAL COST	$382,773.39
DEDUCT - Portion financed by	
Long Term Debt to MOE	$382,773.39
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	$238,841.87

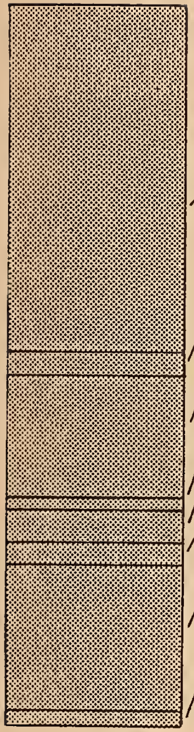
Net Operating	$ 25,486.32
Debt Retirement	4,463.00
Reserve	1,130.07
Interest Charged	21,465.53
TOTAL	$ 52,544.92

RESERVE ACCOUNT

Balance @ January 1, 1972	$ 23,247.24
Deposited by Municipality	1,130.07
Interest Earned	1,518.91
	$ 25,896.22
Less Expenditures	1,370.25
Balance @ December 31, 1972	$ 24,525.97

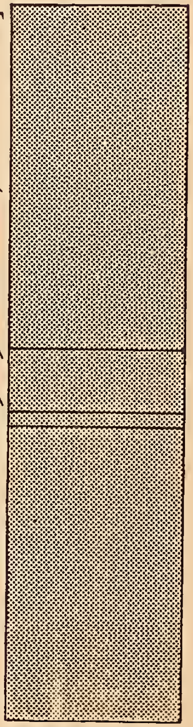
1972 COSTS

OPERATING COSTS



PAYROLL	48 %
FUEL	4 %
POWER	17 %
CHEMICALS	2 %
GENERAL SUPPLIES	5 %
EQUIPMENT	NIL %
REPAIRS & MAINTENANCE	3 %
SUNDRY	19 %
WATER	2 %
TRAVEL	NIL %

TOTAL ANNUAL COST



NET OPERATING	48 %
DEBT RETIREMENT	9 %
RESERVE	2 %
INTEREST	41 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			$ per million gal	¢ per lb BOD
1968	388.37	22,110.92	56.93	5 cents
1969	390.30	28,721.33	73.58	6 cents
1970	430.7	26,161.31	60.70	5 cents
1971	401.9	29,898.26	74.30	6 cents
1972	386.3	26,545.50	68.70	8 cents

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	1368.40	1301.14					6.79		13.87	46.60		
FEB	3628.76	1349.51		390.52	488.32		163.72		60.60	1127.05	49.04	
MAR	2561.52	1093.31		98.21	525.24		2.85			792.87	49.04	
APR	1693.22	1129.47			385.00		32.16		65.50	32.05	49.04	
MAY	2912.24	1098.05		128.34	477.54		46.87		548.95	563.45	49.04	
JUNE	2833.48	1608.63		118.30	371.36	61.52	406.17		202.11	16.35	49.04	
JULY	1217.54				401.65	177.00	130.06			452.00	56.83	
AUG	499.51	1080.51		157.69	315.81	177.00	66.31		(1355.43)	(2.06)	59.68	
SEPT	1144.74			128.34	290.40		170.57		99.26	497.13	49.04	
OCT	906.48	(23.37)			301.11				527.87	28.46	72.41	
NOV	2513.87	1087.03	(64.32)		380.86		12.35			1054.61	43.34	
DEC	4206.56	2519.74		132.24	349.79	88.50	233.73		533.71	305.51	43.34	
TOTAL	25486.32**	*** 12244.02	(64.32)	1153.64	4287.08	504.02	1271.58		696.44	4824.02	569.84	

Brackets indicate credit.

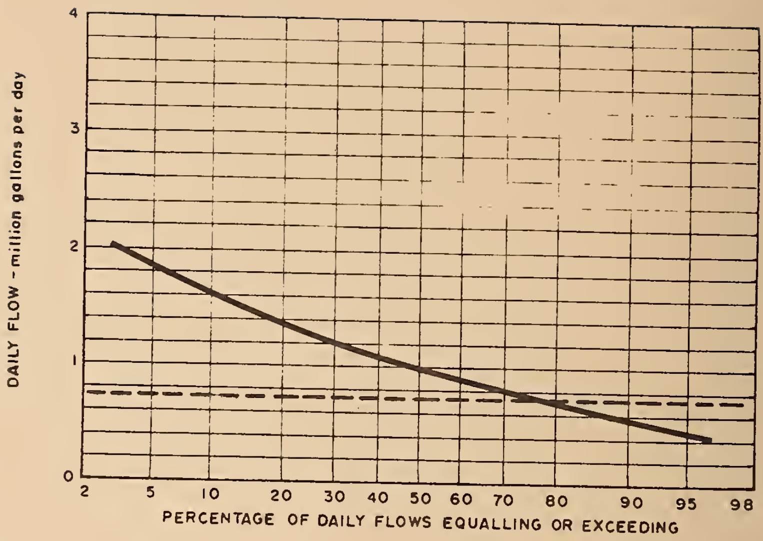
* Sundry includes sludge haulage costs of $3,146.50

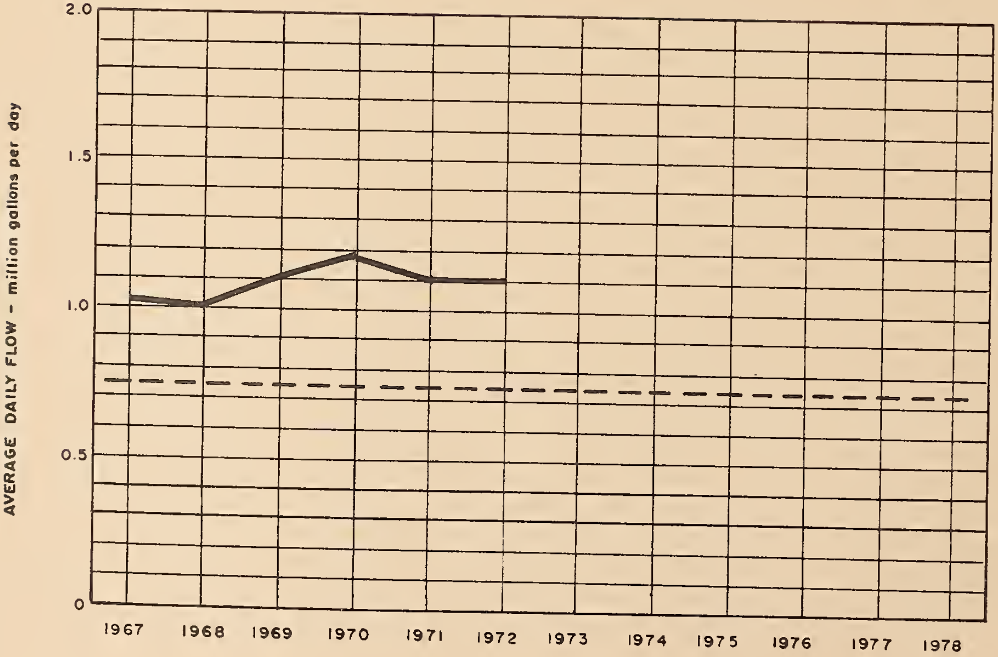
** Corrected March 73 to $26,545.50

*** Corrected March 73 to $13,303.20

PROCESS DATA

FLOWS



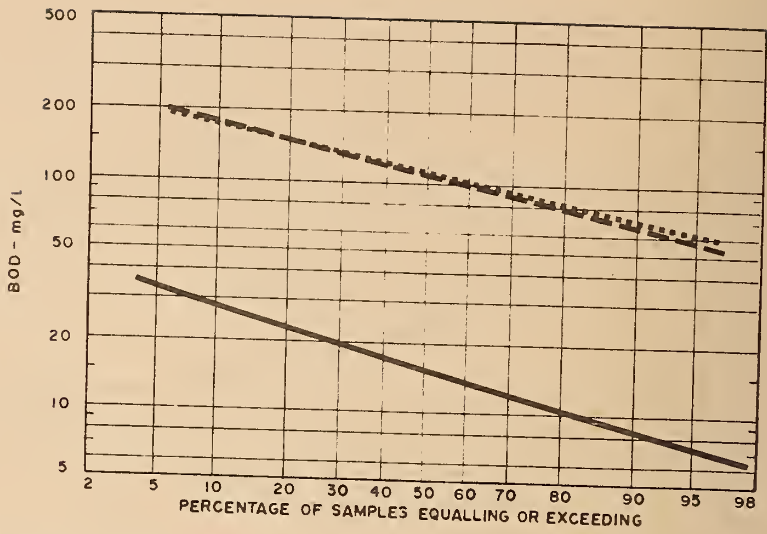


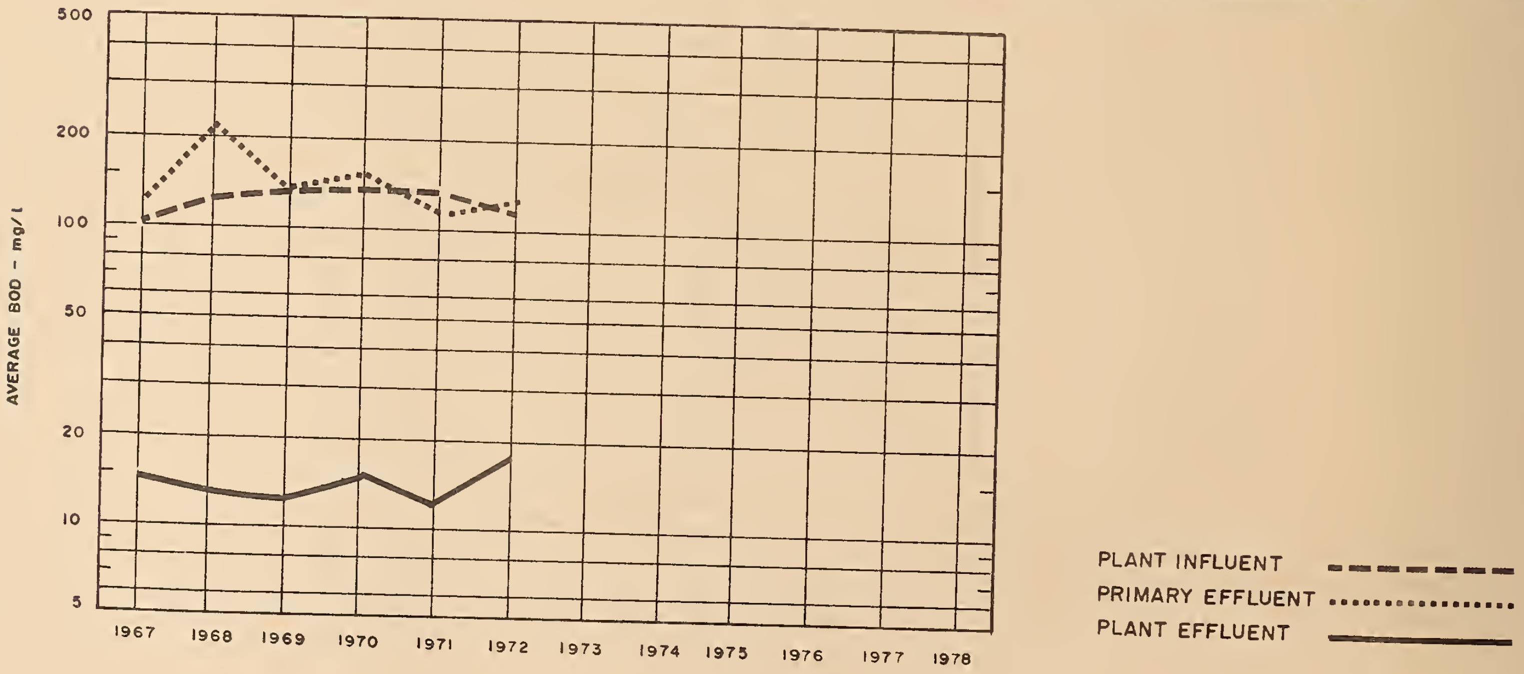
DESIGN CAPACITY - - - - - - - -

PLANT PERFORMANCE

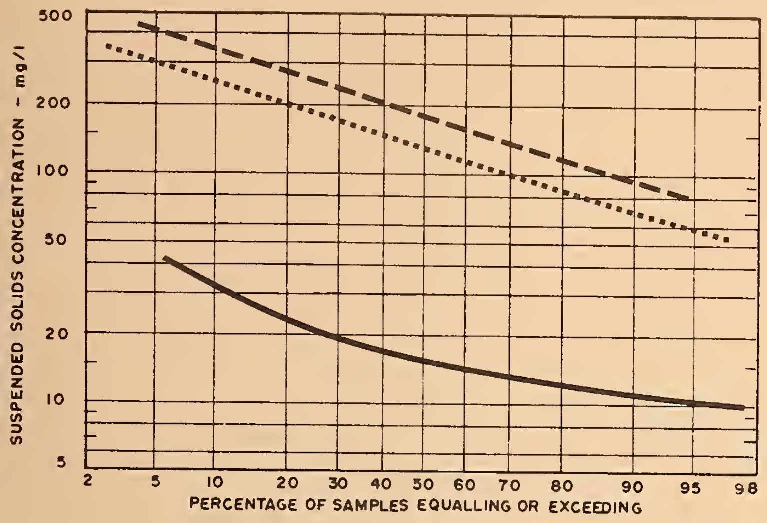
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10^3 pounds			%	10^3 pounds		
JAN	44.6	1.43	2.42	63	18	71	20	243	19	92	100	4.2	1.5
FEB	33.3	1.14	1.50	160	18	89	47	172	24	86	49	11.0	7.5
MAR	44.0	1.42	2.15	120	18	85	45	227	38	83	83	7.7	3.2
APR	42.4	1.41	2.44	95	20	79	32	130	20	85	47	6.9	3.7
MAY	28.9	.93	1.91	70	7	90	18	135	13	90	35	5.0	4.6
JUNE	21.8	.73	1.60	160	30	81	28	167	15	91	33	13.0	5.2
JULY	22.9	.73	1.74	130	-	-	-	162	11	93	34	12.0	7.8
AUG	27.0	.87	1.81	60	7	88	14	145	13	91	36	6.5	2.0
SEPT	18.9	.63	1.17	170	18	89	29	238	9	96	43	16.0	8.5
OCT	23.1	.74	1.71	140	22	84	27	265	10	96	59	11.0	10.0
NOV	34.3	1.14	2.14	110	14	87	33	110	10	91	34	6.8	4.9
DEC	45.1	1.45	2.36	100	28	72	32	110	12	89	44	10.0	5.4
TOTAL	386.3	-	-	-	-	-	-	-	-	-	597	-	-
AVG.	-	1.10	MAXIMUM 2.44	111	18	84	29	186	17	91	50	8.7	5.1
No. of Samples	-	-	-	13	12	-	-	35	33	-	-	13	13

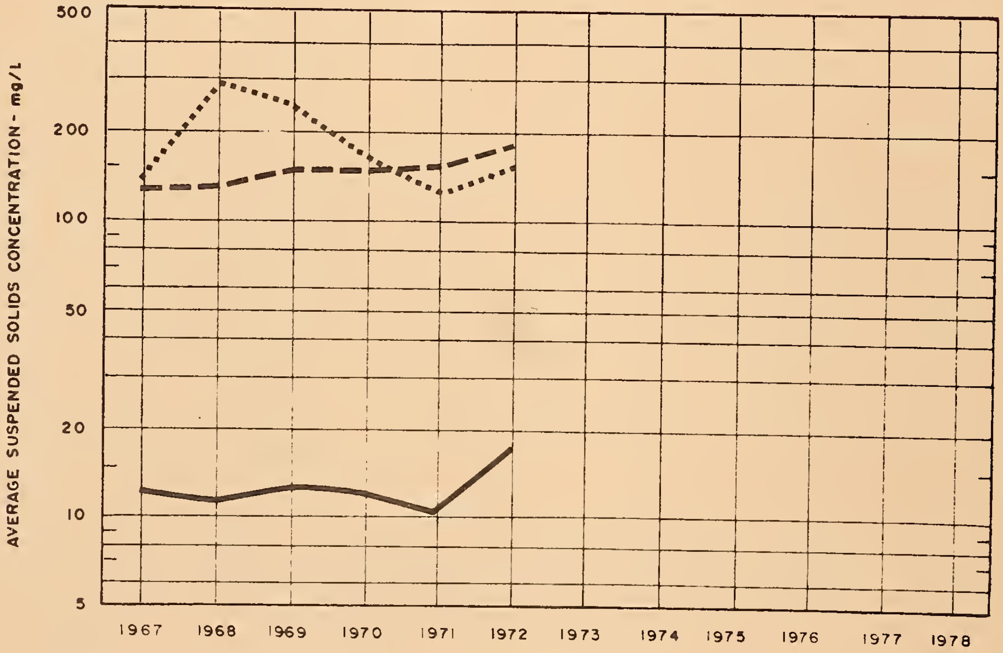
BIOCHEMICAL OXYGEN DEMAND





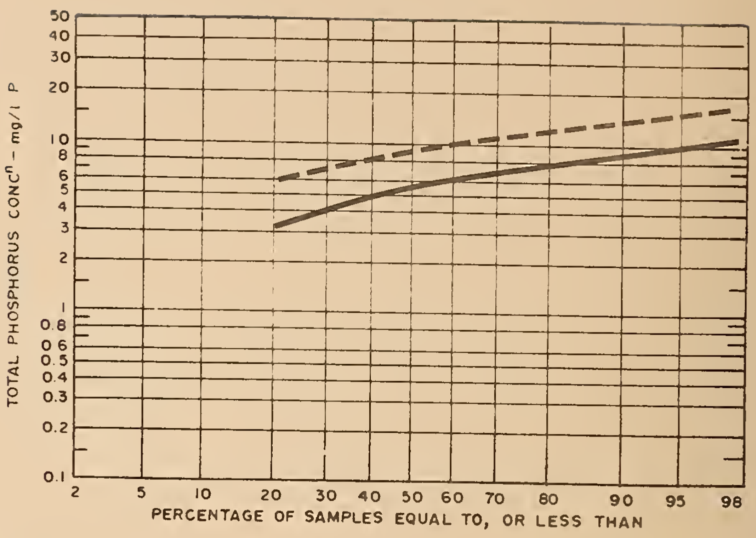
SUSPENDED SOLIDS

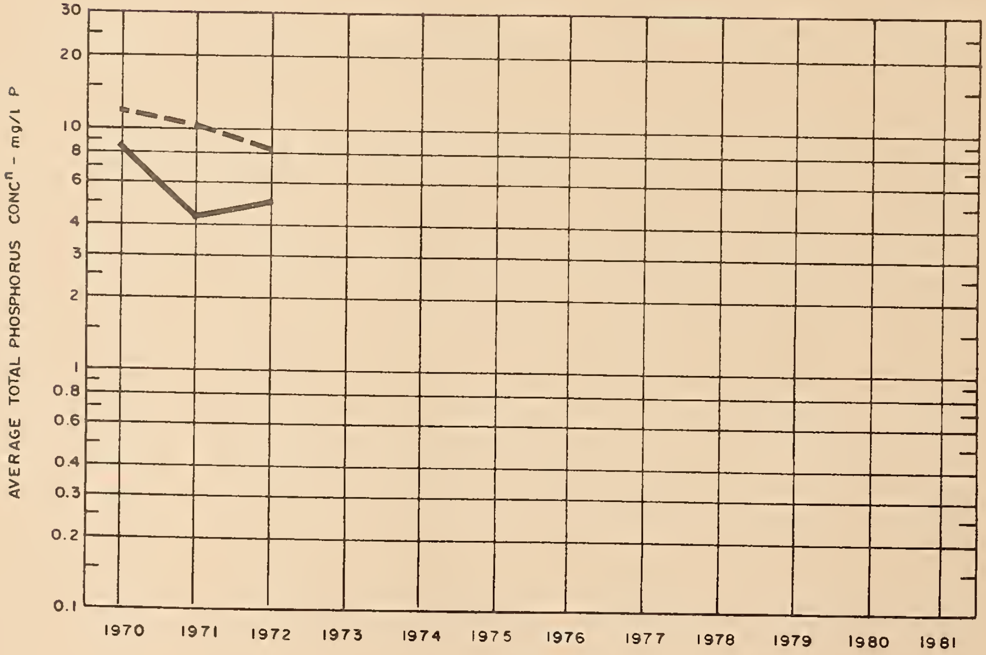




PLANT INFLUENT – – – – – –
PRIMARY EFFLUENT ••••••••••••••••
PLANT EFFLUENT ———————

PHOSPHORUS

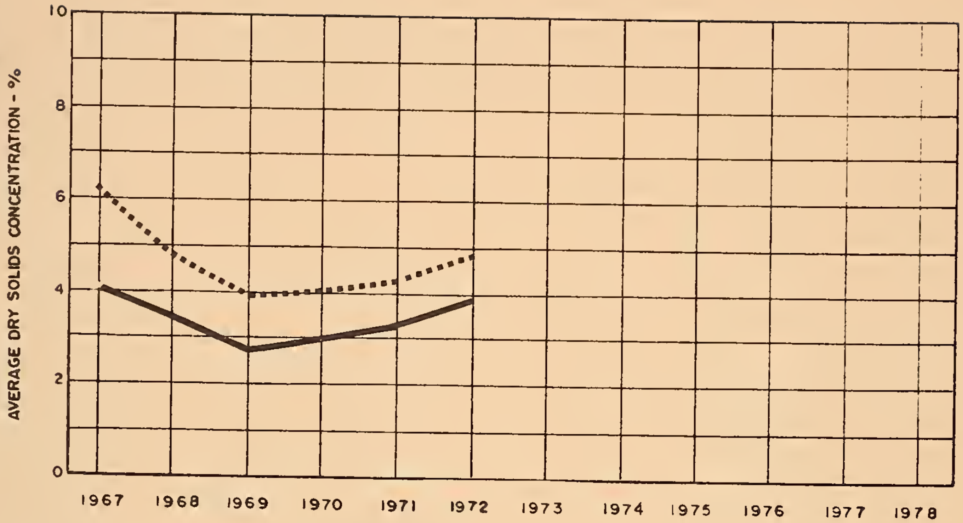




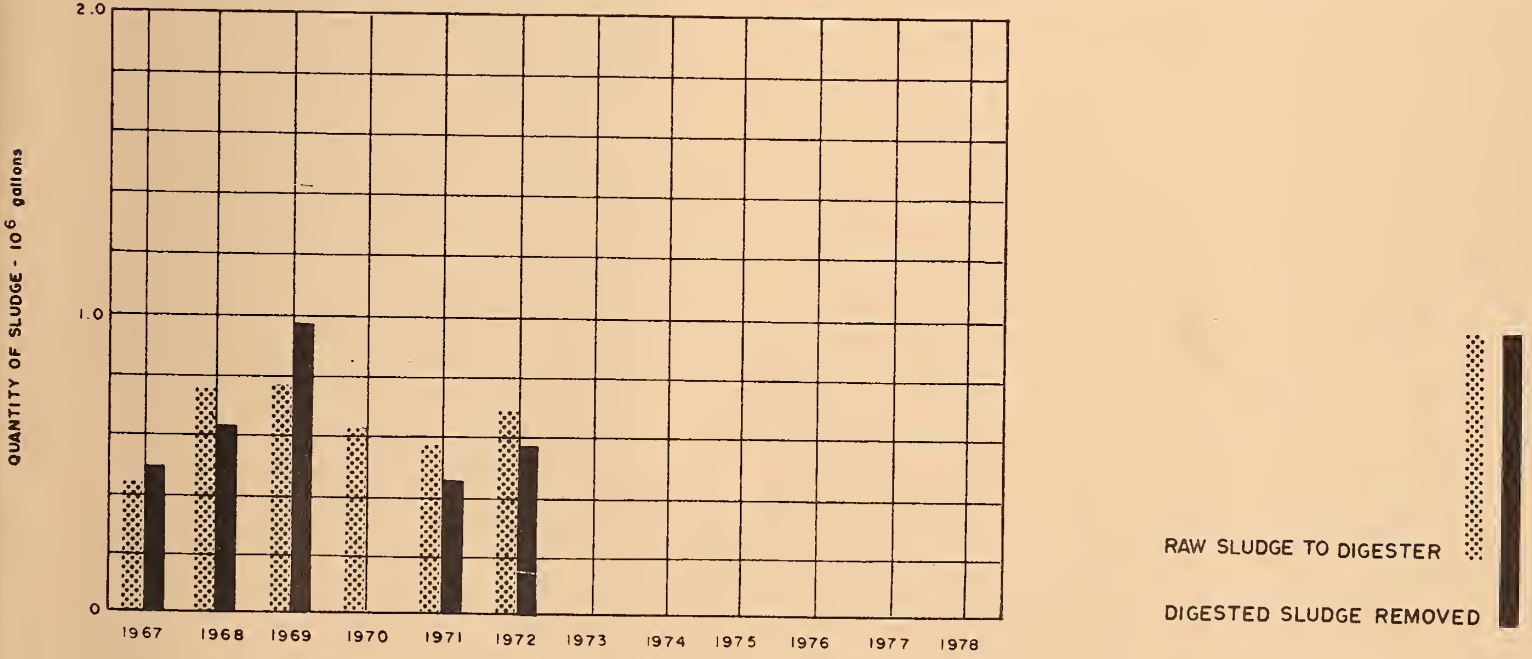
PLANT INFLUENT - - - - - -

PLANT EFFLUENT ———

DIGESTION



RAW SLUDGE ••••••••••••••
DIGESTED SLUDGE ▬▬▬
AVERAGE DRY SOLIDS CONCENTRATION - %
10
8
6
4
2
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978



QUANTITY OF SLUDGE - 10^6 gallons
2.0
1.0
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER ▨
DIGESTED SLUDGE REMOVED ▮

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-NATANT	
	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	T. S. %	AMOUNT HAULED cubic yards
JAN	45	–	–	65	128	3200	.11	1.8	54	5.4	79	80.	4.4	52		475
FEB	42	–	–	160	165	3100	.22	.9	64	6.1	68	50	2.9	–		298
MAR	12	–	–	110	235	2800	.20	.8	51	7.8	72	50	2.7	72		298
APR	33	–	–	90	110	3000	.16	1.0	39	–	–	41	–	–		241
MAY	28	407	3.6	95	135	2400	.13	2.1	86	–	–	61	–	–		362
JUNE	10	904	4.1	140	125	1900	.19	1.9	54	4.2	–	32	–	–		187
JULY	15	755	3.3	70	110	1500	.12	–	55	5.3	70	44	4.3	52		261
AUG	24	757	2.8	90	90	1200	.24	1.5	52	2.9	75	41	–	–		242
SEPT	31	636	3.3	160	216	1900	.20	1.2	48	3.4	77	47	3.9	62		279
OCT	26	251	2.6	200	165	2000	.27	.8	60	3.0	81	47	4.8	–		279
NOV	27	–	–	120	90	1700	.30	.9	62	–	–	44	–	–		261
DEC	16	–	–	120	135	1700	.37	.8	60	–	–	44	–	–		259
TOTAL	309	3710	–	–	–	–	–	–	685	–	–	581	–	–	–	3442
AVG.	.8 cu.ft/mil gal	742	3.3	118	142	2200	.21	1.3	57	4.8	75	48	3.8	60		287

Chlorination Period: May 16 to October 15. Flow chlorinated - 111.6 M.G.

Date Due

Ontario. Ministry of the Environment. Project Operations Branch.

Burlington-Elizabeth Gardens - Water Pollution Control Plant. 1972.

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